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Nutritional grouping
Considering nutritional grouping
For improved feed efficiency

Opportunity to increase productivity
Cows receive more precise diets

Diets closer to requirements
Saves feed costs and increases income over feed costs

Improved profitability
IOFC gains exceed additional expenses or losses

Additional benefits
- ↓ environmental concerns
- ↓ health disorders
Nutritional Grouping: Ration Options

- **Dry**: Far-Off, Close-Up; Single

- **Lactating**: Single; Fresh, Rest; Fresh, Late, Rest; Fresh, Multiple by combo of Milk Yield, DIM, BCS
Limitations to Multiple Rations

- # of Pens, Pen Size; Mixer Size
- Multiple mgmt pens - 1st Lact, AI, high SCC, DNB, etc., etc.
- Production level
- Labor to: move cows, mix/feed
- Production loss from pen moves?
- Desire to KISS
Why farmers do not group more?
Trying to find most important constraints

2-page mailed survey

Constraints to feeding more ration groups

1. Milk drops when cows are moved
2. Desire to keep management simple
3. Conflicts with grouping for reproduction
4. Farm facilities do not allow it
5. Not enough labor or personnel to handle it

Results (responses)
- 196 WI farms
- 211 MI farms

~51% farms do not group beyond fresh cows

Contreras-Govea et al., 2015, JDS 98:1336-1344
Simulation study...
Diagram flow of simulation modeling framework. Panel A: The main application reads a preprocessed input file and then *Initializer* (1) is used to instantiate the herd object. Following completion of this process *Groups* are created (2), and cows are being initialized based on the input cows from a herd (3). Finally these cows are added to the appropriate group (obligated or optional).
Herd

Obligated Groups

Fresh group (0-21 DIM)

| cow_1 | cow_2 | ... | cow_n |

Dry group

| cow_1 | cow_2 | ... | cow_n |

Optional Groups

Group 1

| cow_1 | cow_2 | ... | cow_n |

Group 2

| cow_1 | cow_2 | ... | cow_n |

Group 3

| cow_1 | cow_2 | ... | cow_n |

B

TMR

TMR_1

TMR_2

TMR_3

TMR_4

TMR_5
Diagram flow of simulation modeling framework. Panel B is a schematic representation of a herd with 3 optional groups for lactating cows. At the beginning of the simulation (day 0) and at the end of each month the cows are ranked based on their nutritional requirements, are regrouped among the optional groups, and fed with a TMR formulated based on the group requirements. Depending on their state, cows move into a dry group or fresh group.
### Studied herds

All data collected at the **cow-level**

<table>
<thead>
<tr>
<th>Herd (size)</th>
<th>570</th>
<th>787</th>
<th>727</th>
<th>331</th>
<th>1460</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd ME 305, kg</td>
<td>16,140</td>
<td>12,884</td>
<td>13,897</td>
<td>13,348</td>
<td>14,188</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; lactation, %</td>
<td>43</td>
<td>39</td>
<td>39</td>
<td>38</td>
<td>45</td>
</tr>
<tr>
<td>Average DIM</td>
<td>187</td>
<td>178</td>
<td>201</td>
<td>208</td>
<td>189</td>
</tr>
<tr>
<td>21-d PR, %</td>
<td>18</td>
<td>19</td>
<td>19</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Culling risk, %</td>
<td>32</td>
<td>37</td>
<td>36</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>BW available</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>
Findings
Decision support tool...

http://DairyMGT.info
Helping dairy farms improve economic performance

This site is designed to support dairy farming decision-making focusing on model-based scientific research. The ultimate goal is to provide user-friendly computerized decision support tools to help dairy farmers improve their economic performance along with environmental stewardship.

University of Wisconsin

University of Wisconsin - Madison
UW - Cooperative Extension
UW - Dairy Science
Dairy Cattle Reproduction
Dairy Cattle Nutrition
Milk Quality
UW Dairy Nutrient
Understanding Dairy Markets
UW Center for Dairy Profitability

Latest Projects

Improving Dairy Farm Sustainability
Genomic Selection and Herd Management
Dairy Reproduction Decision Support Tools
Strategies of Pasture Supplementation
Improving Dairy Cow Fertility

Contact

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Victor E. Cabrera, Ph.D.
Management Tools to Increase Dairy Cow Feed Efficiency
A simplified online tool (grouping)
Herd-specific assessments (DairyMGT.info)
Additional costs and benefits

Impacts group feeding strategies

Management cost
• Additional labor
• Extra management

Avoided costs
• Additives and supplements savings

Possible milk loss
• Cow social interactions
Grouping Strategies

Farm/herd possibilities and decision-making

Current Groups

NO

How many can?

Current diet

Group sizes

Added Cost & Benefits

YES

Current Groups

How many done?

How many can?

Current diet

Group sizes

Added Cost & Benefits
Wisconsin herds analysis with tool
Analysis from dairy farm records
30 Wisconsin dairy farms

No grouping vs. 3 groups
• Same size groups

Grouping criterion
• Cluster

Same prices for all
• $0.35/kg milk
• $0.315/kg CP
• $0.1174/Mcal NE

Projected body weight
• 500 kg primiparous
• 600 kg multiparous
## Analysis from dairy farm records

30 Wisconsin dairy farms

<table>
<thead>
<tr>
<th>Lactating cows (n=30)</th>
<th>1 Group</th>
<th>3 Groups</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Income Over Feed Cost $/cow.yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>&lt;200</td>
<td>697</td>
<td>1,059</td>
</tr>
<tr>
<td>Mean</td>
<td>788</td>
<td>2,311</td>
<td>2,707</td>
</tr>
<tr>
<td>Maximum</td>
<td>&gt;1,000</td>
<td>2,967</td>
<td>3,285</td>
</tr>
</tbody>
</table>

**Increase of IOFC ($/cow per year)**

- **Mean** = $396
- **Range** = $161 to $580
Mooving Forward.
DAIRY SCIENCE AT WISCONSIN

Questions?